

APPENDIX I—AFT PRESSURE BULKHEAD

This appendix contains the aft pressure bulkhead inspection locations, the inspection method, and the strain survey correlation, as discussed in section 10.

Page	Description
I-4	Inspection locations and methods (figures I-1 through I-10)
I-14	Strain survey and correlation (figures I-11 through I-27)

The critical areas and inspection methods listed below were conducted by Boeing prior to delivery of the aft pressure bulkhead test article.

Inspection Area	Structure Inspected	Inspection Method	Reference
A	Bulkhead Stiffeners, Webs, and Upper Scalloped Doubler	Visual	Figure I-1
B	Doorjamb and Bulkhead Web Bulkhead Lap Splice	HFEC	Figure I-2
		Visual	Figure I-2
C	Doorjamb Pin Holes	Visual	Figure I-3, I-4
		HFEC	Figure I-3
D	Bulkhead Tee Bulkhead Tee	Visual	Figure I-5
		LFEC	Figure I-6, I-7, I-8, I-9, I-10

I.1 INSPECTION AREA A (FIGURE I-1)—BULKHEAD STIFFENERS, WEBS, AND UPPER SCALLOPED DOUBLER.

Visual inspection had been performed of all the radial stiffeners, the firex wye support vertical stiffener, webs attached to radial stiffeners and firex wye support vertical stiffener, and the upper scalloped doubler attach points. This inspection requires access to both the forward and aft sides of the bulkhead.

I.2 INSPECTION AREA B (FIGURE I-2)—DOORJAMB AND BULKHEAD SKIN LAP SPLICE.

Inspection Area B was located at the bottom centerline of the bulkhead emergency exit. The following three inspections were performed.

1. High-frequency eddy-current inspection of the doorjamb around the edges of the Tee, as shown in figure I-2, View A-A. This inspection requires access to the aft side of the bulkhead.
2. High-frequency eddy-current inspection of the bulkhead skin around the edges of the Plate, as shown in figure I-2, View B-B. This inspection requires access to the forward side of the bulkhead.
3. Visual inspection of the skin and finger doublers of the bulkhead lap splice in the area of the centerline from doorjamb to floorline, as shown in figure I-2 Views A-A and B-B. This inspection requires access to both the forward and aft sides of the bulkhead.

I.3 INSPECTION AREA C (FIGURES I-3 AND I-4)—PRESSURE BULKHEAD DOORJAMB AND RECEPTACLE FITTING PIN HOLES.

The following two inspections have been performed.

1. Visual inspection of the doorjamb in the area of the pin receptacle fittings (total 10 locations), as shown in figures I-3 and I-4. This inspection requires access to both the forward and aft sides of the bulkhead.
2. High-frequency eddy-current inspection of the inner diameter of the door alignment pin holes (total 10 locations), as shown in figure I-3, View C. This inspection requires access to the forward side of the bulkhead.

I.4 INSPECTION AREA D (DC-9 SERVICE BULLETIN A53-231)—PRESSURE BULKHEAD TEE.

This inspection was intended to achieve S/B A53-231 Fuselage-Main Frame—Inspect/Repair Aft Fuselage Non-Ventral Pressure Bulkhead Tee. The inspection requires visual and low-frequency eddy-current inspections of the cracked aft pressure bulkhead Tee around the entire periphery of the fuselage from the aft side of the bulkhead. The general procedures are outlined below.

The following two inspections were performed.

1. Visual inspection (from the aft side of the bulkhead with the aid of a mirror and a flashlight) of the upper fuselage Tee from Longeron L7 left side to Longeron L7 right side and the lower fuselage Tee from Longeron L17 left side to Longeron L17 right side. The required equipment is a flashlight and an inspection mirror with an adjustable viewing angle. The sketch of the visual method and types of cracks is shown in figure I-5.
2. Low-frequency eddy-current inspection (from the aft side of the bulkhead) of the fuselage Tee from Longeron L7 to Longeron L17 on the left and right sides of the fuselage. The procedure was divided into two sequences based on inspection probe design. The eddy-current reference standard, which was provided by Boeing, is shown in figure I-6.

Sequence 1 - Inspect the Tee tangent area of the upstanding leg using a molded probe that conforms to the radius. Figure I-7 shows how to calibrate the molded probe and place the probe in the radius of the upstanding leg of the Tee and scan the tangent area. The specification of the molded probe is shown in figure I-8.

Sequence 2 - Inspect the Tee extended area of the upstanding leg using a 90 degree probe. The scanning pattern of the 90 degree probe is shown in figure I-9. The specification of the 90 degree probe is shown in figure I-10.

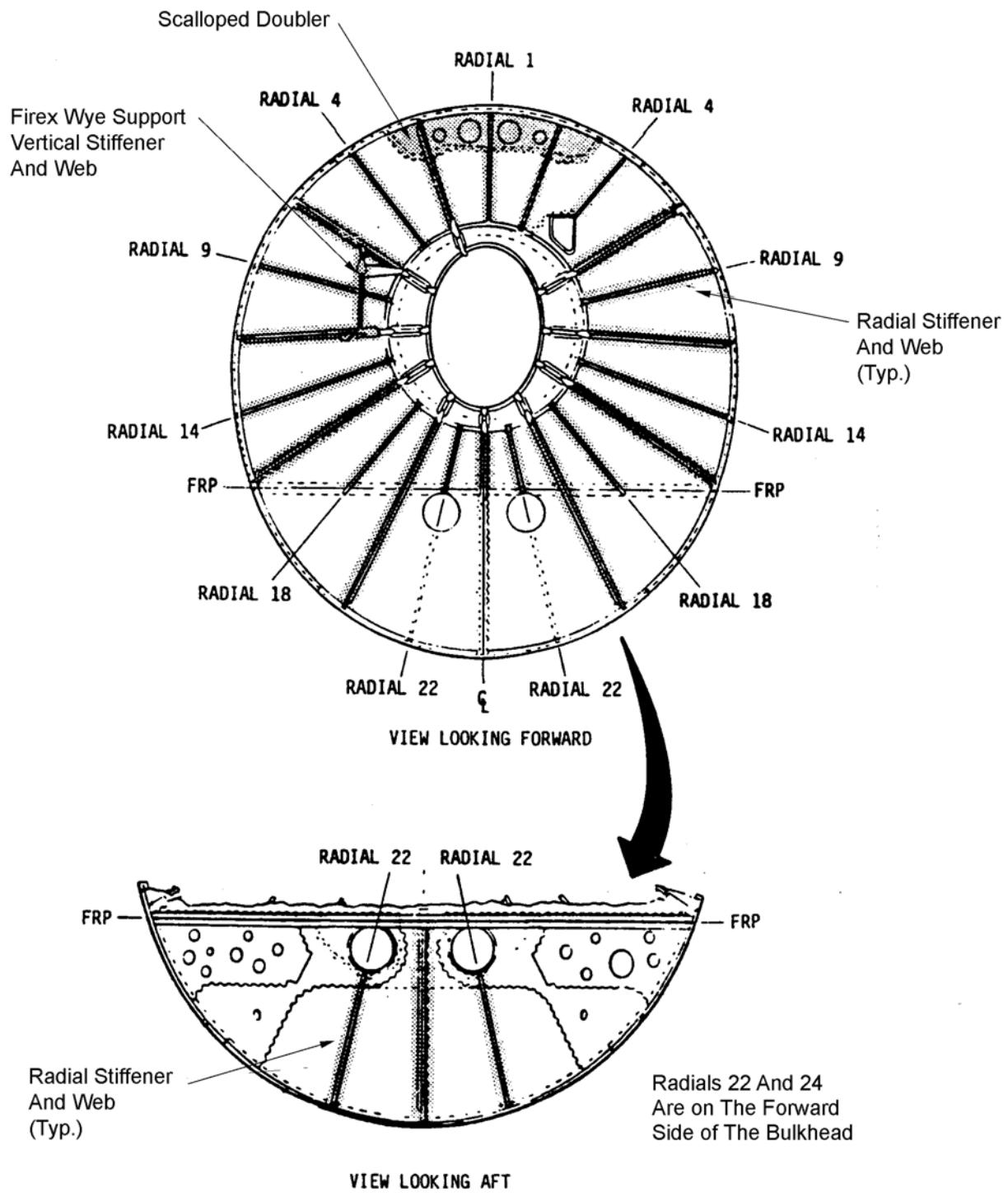


FIGURE I-1. INSPECTION AREA A—(VISUAL) STIFFENERS, WEBS, AND UPPER SCALLOPED DOUBLER

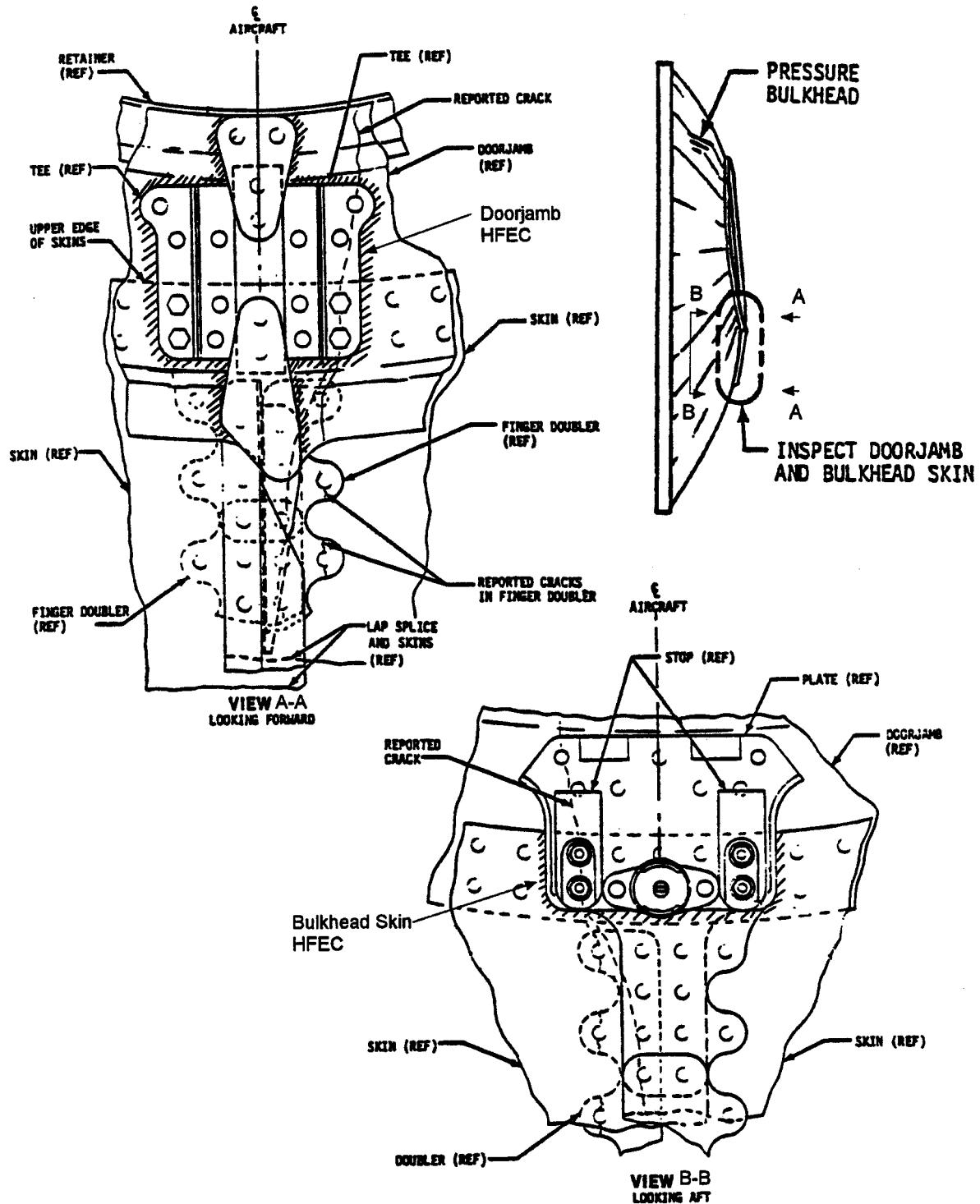


FIGURE I-2. INSPECTION AREA B—(VISUAL AND HFEC) DOORJAMB AND BULKHEAD SKIN LAP SPLICE

HFEC of The Pin Hole in The Receptacle Fitting
(Typical 10 Places)

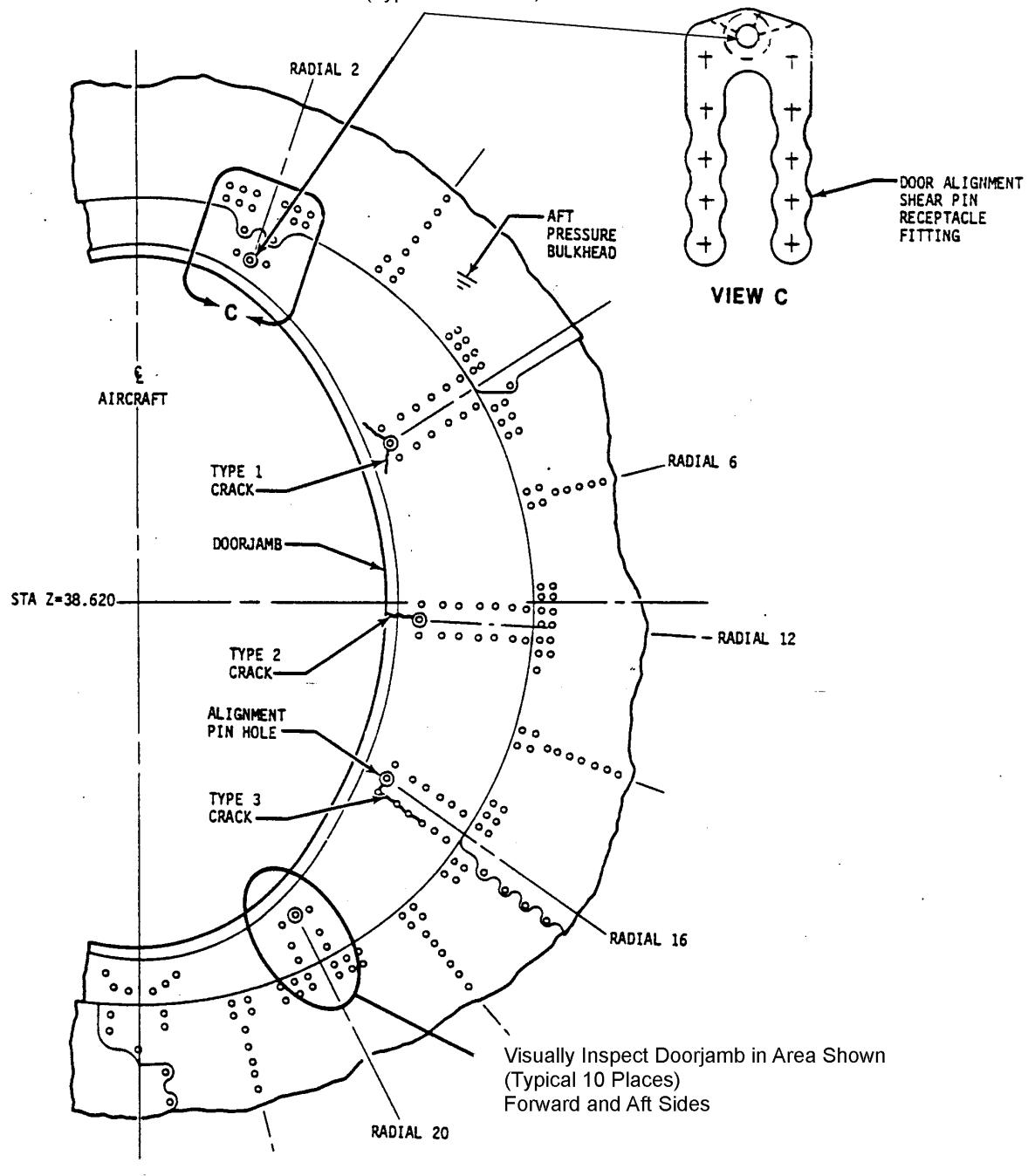


FIGURE I-3. INSPECTION AREA C—(VISUAL AND HFEC) PRESSURE BULKHEAD
DOORJAMB AND RECEPTACLE FITTING PIN HOLES

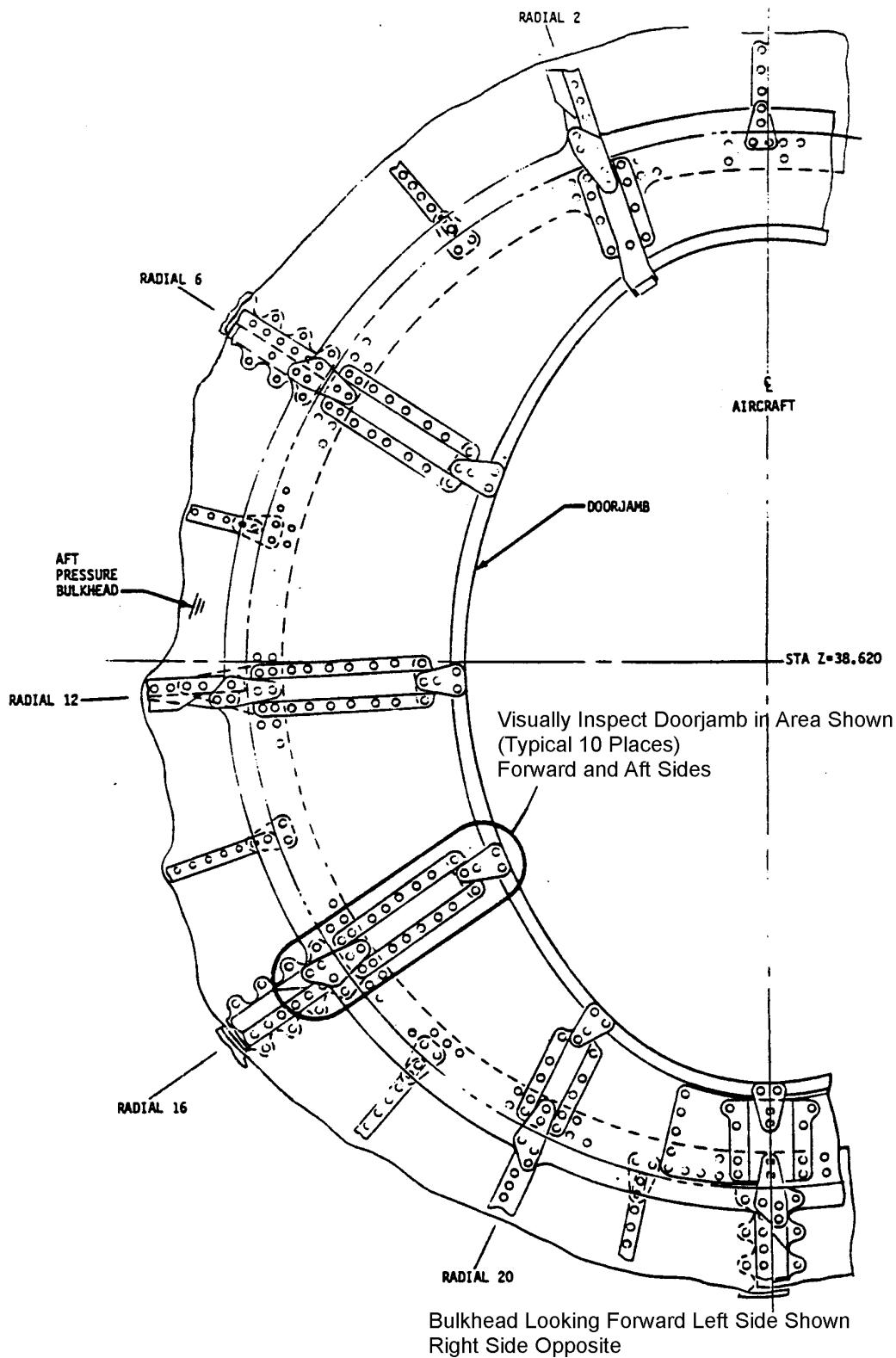


FIGURE I-4. INSPECTION AREA C—(VISUAL) PRESSURE BULKHEAD DOORJAMB

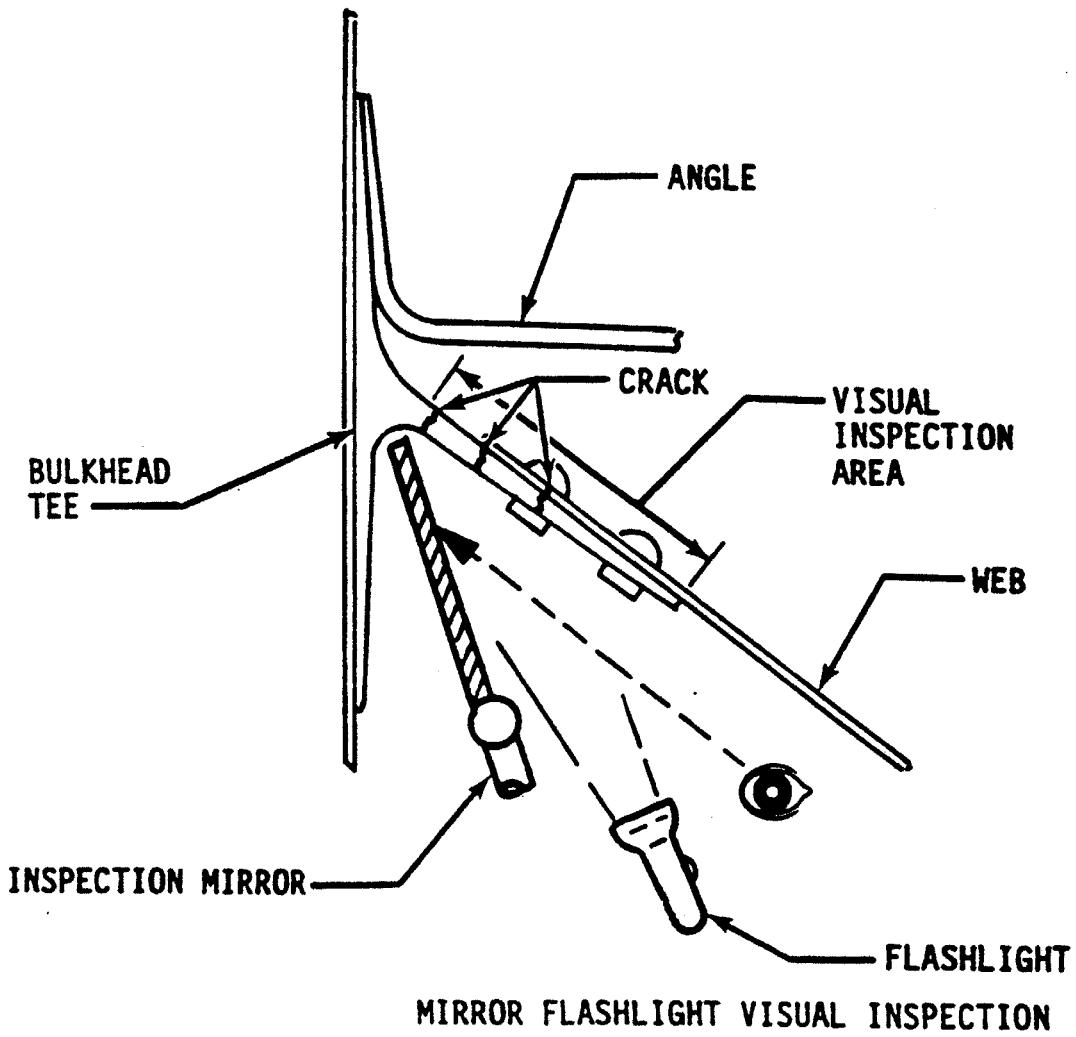
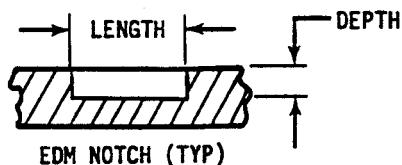
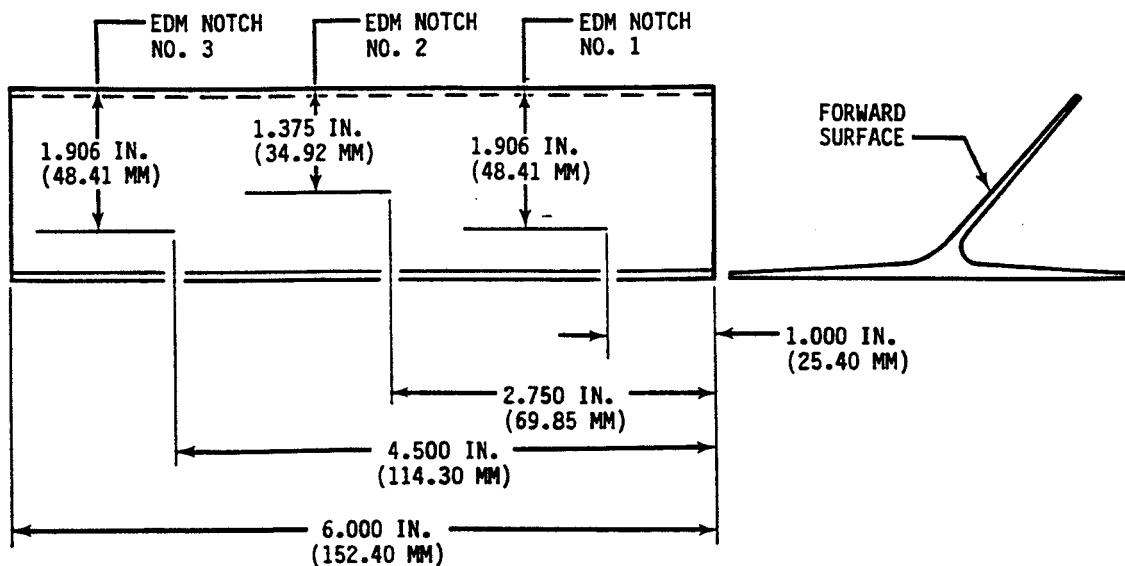


FIGURE I-5. INSPECTION AREA D—(VISUAL) PRESSURE BULKHEAD TEE



DETAIL SB09530231-9 EDDY CURRENT REFERENCE
STANDARD MAKE FROM 1D0008S TEE-EXTRUDED
SECTION (2024-0) HEAT TREAT TO 2024T42.

GENERAL NOTES:

1. EDM NOTCH MAXIMUM WIDTH .010-INCH (.25 MM).
2. NOTCH TO BE ON AND PERPENDICULAR TO FORWARD SURFACE.
3. SCALE NONE.
4. THIS SB09530231-9 EDDY CURRENT REFERENCE STANDARD REQUIRED TO ACCOMPLISH OPTION I WILL BE MADE AVAILABLE BY DAC AT NO CHARGE, SEE PARAGRAPH 1.H.

	EDM NOTCH		
	1	2	3
LENGTH	1.000	1.000	1.000
DEPTH	0.055	0.050	0.028

TOLERANCES

IN. = INCHES MM = MILLIMETERS
 ANGLES $\pm 0^\circ 30'$
 3 PLACE DECIMAL $\pm .015$ IN. (0.38 MM)
 2 PLACE DECIMAL $\pm .03$ IN. (0.8 MM)

FIGURE I-6. EDDY-CURRENT REFERENCE STANDARD

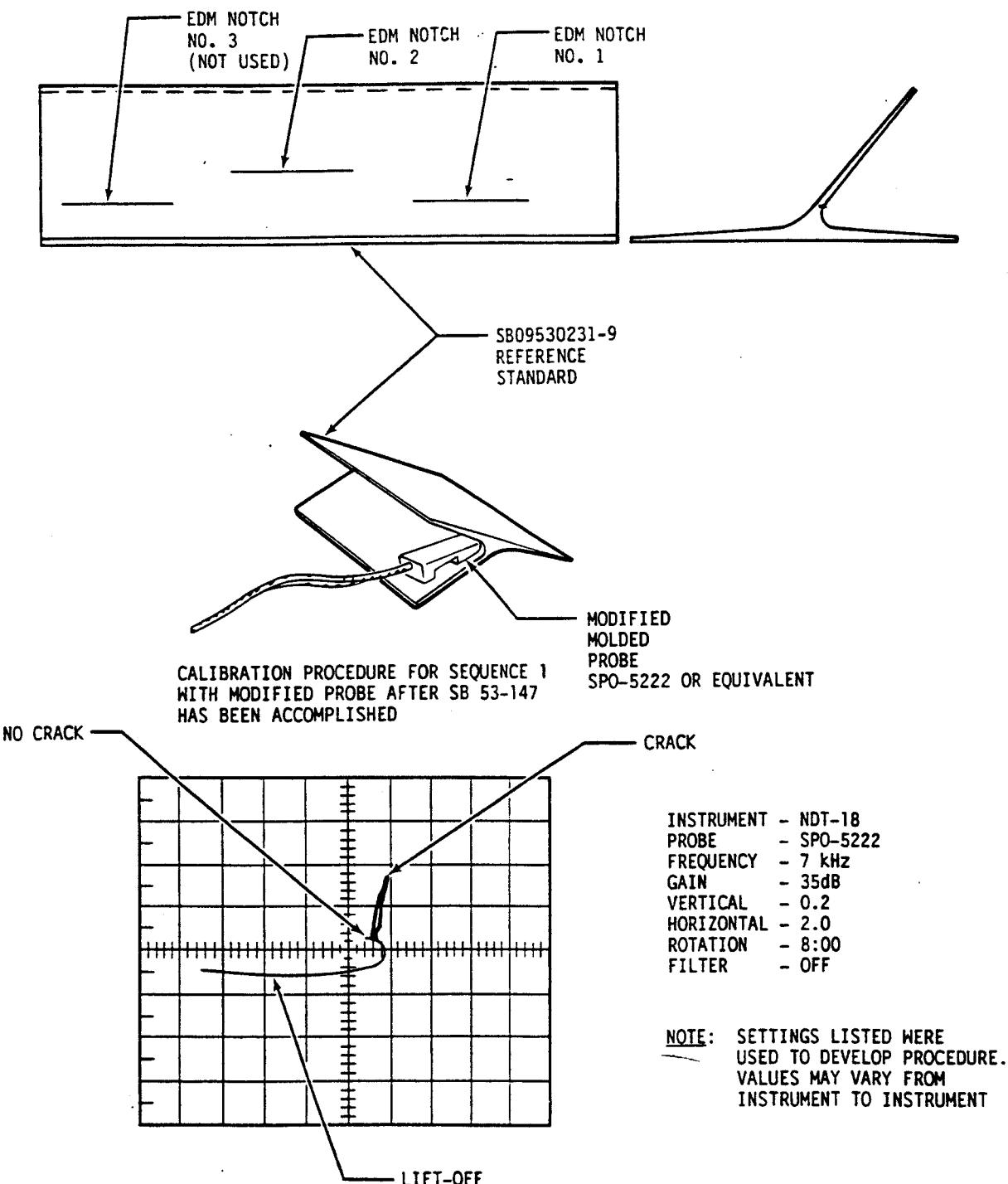
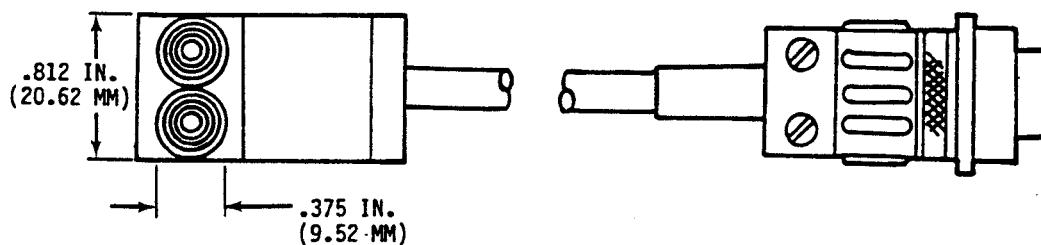
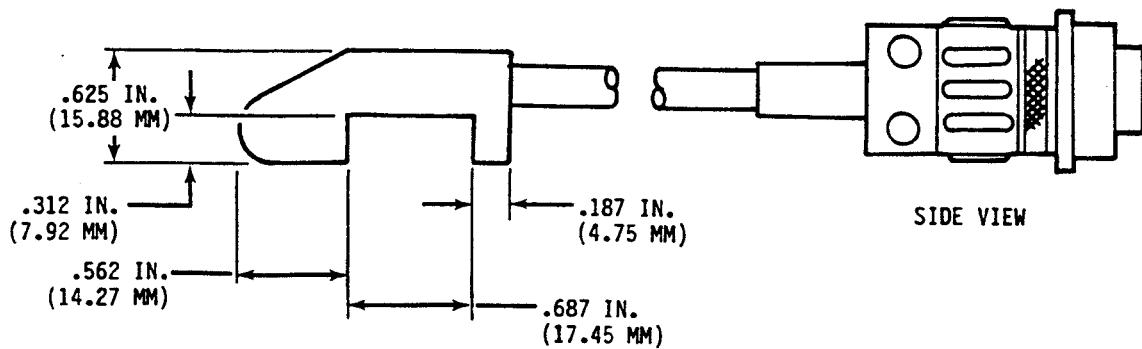
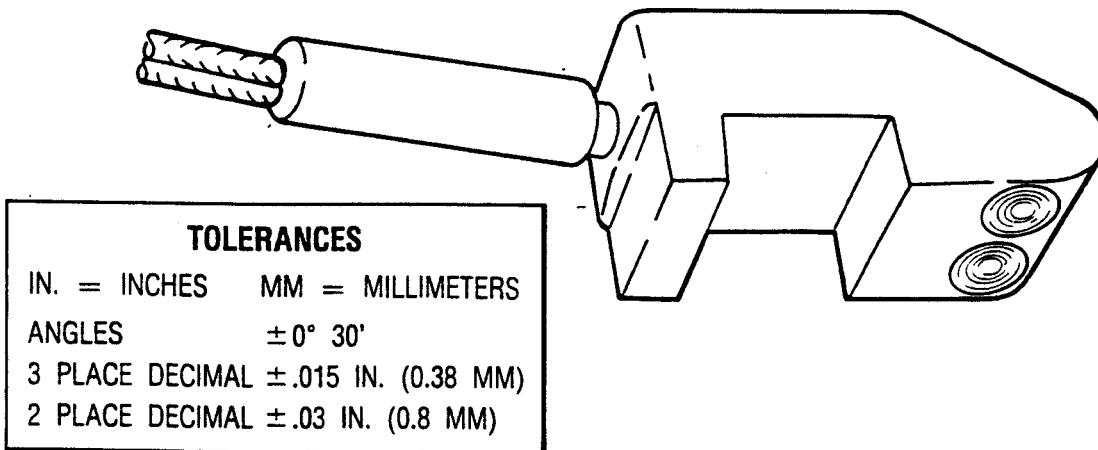
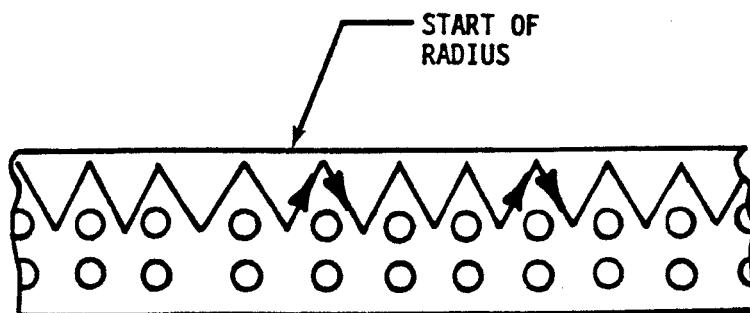
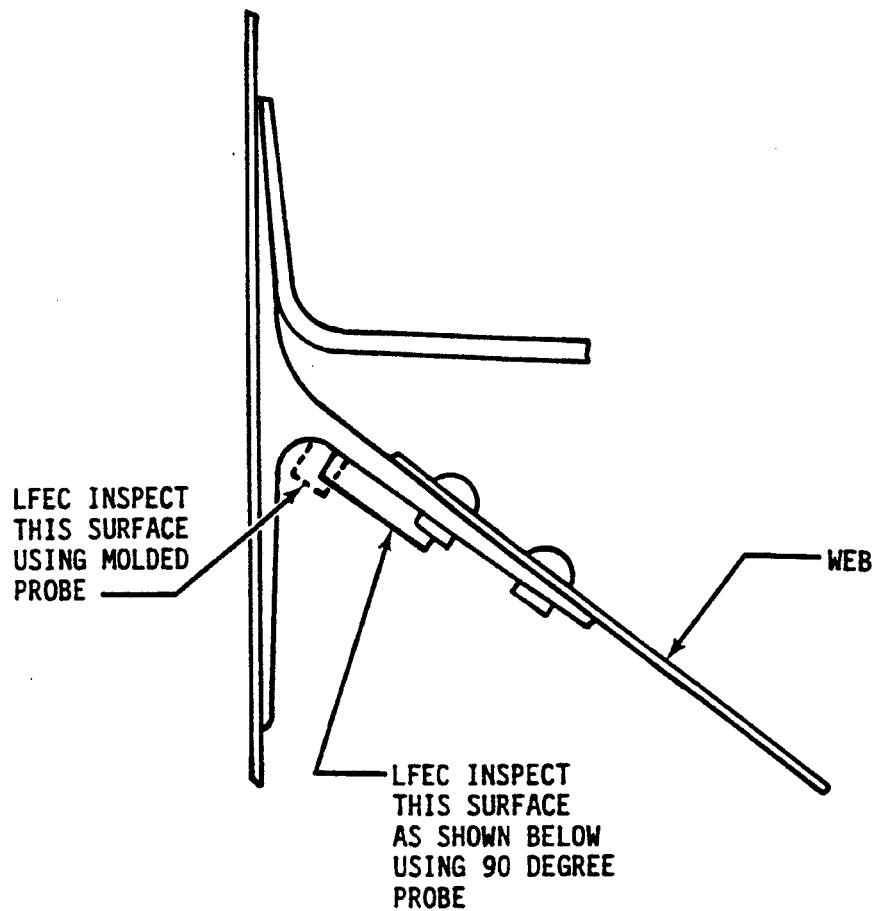


FIGURE I-7. MOLDED PROBE CALIBRATION PROCEDURE



ZETEC INCORPORATED C/N 935-0120 P/N APB/MSP
LOW FREQUENCY EDDY CURRENT PROBE OR EQUIVALENT

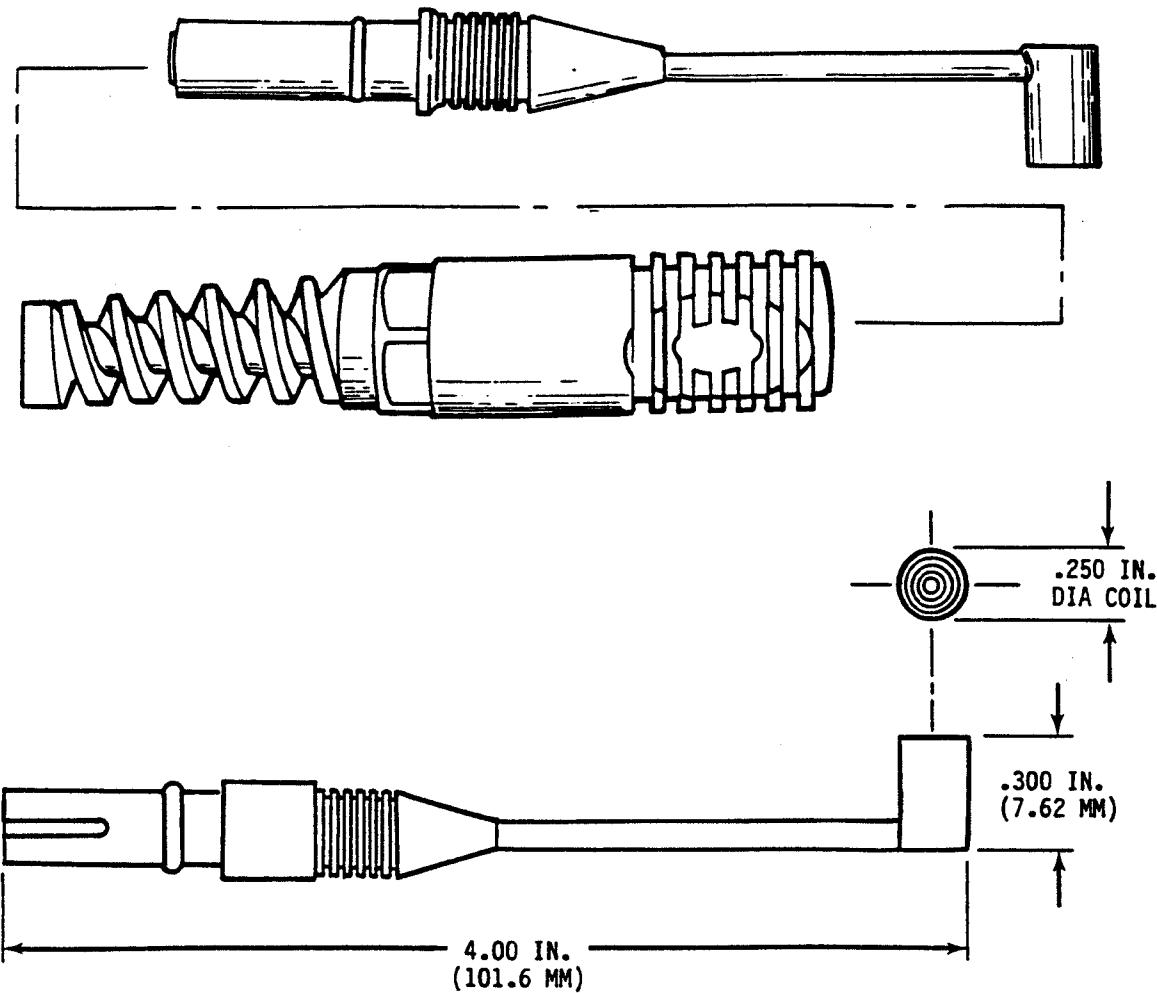
FIGURE I-8. SPECIFICATION OF MOLDED PROBE



SCANNING PATTERN
FOR LFEC INSPECTION
OF SUBJECT SURFACE
USING 90 DEGREE PROBE

INSPECTION AREA ON TEE

FIGURE I-9. SCANNING PATTERN OF PROBE



ZETEC INCORPORATED C/N 910-5830 P/N APB/90DP
LOW FREQUENCY EDDY CURRENT PROBE OR EQUIVALENT

FIGURE I-10. SPECIFICATION OF PROBE

The following pages contain the strain survey prediction using nonlinear finite element solutions and the measured results from test panels, which are discussed in section 10.11.1.

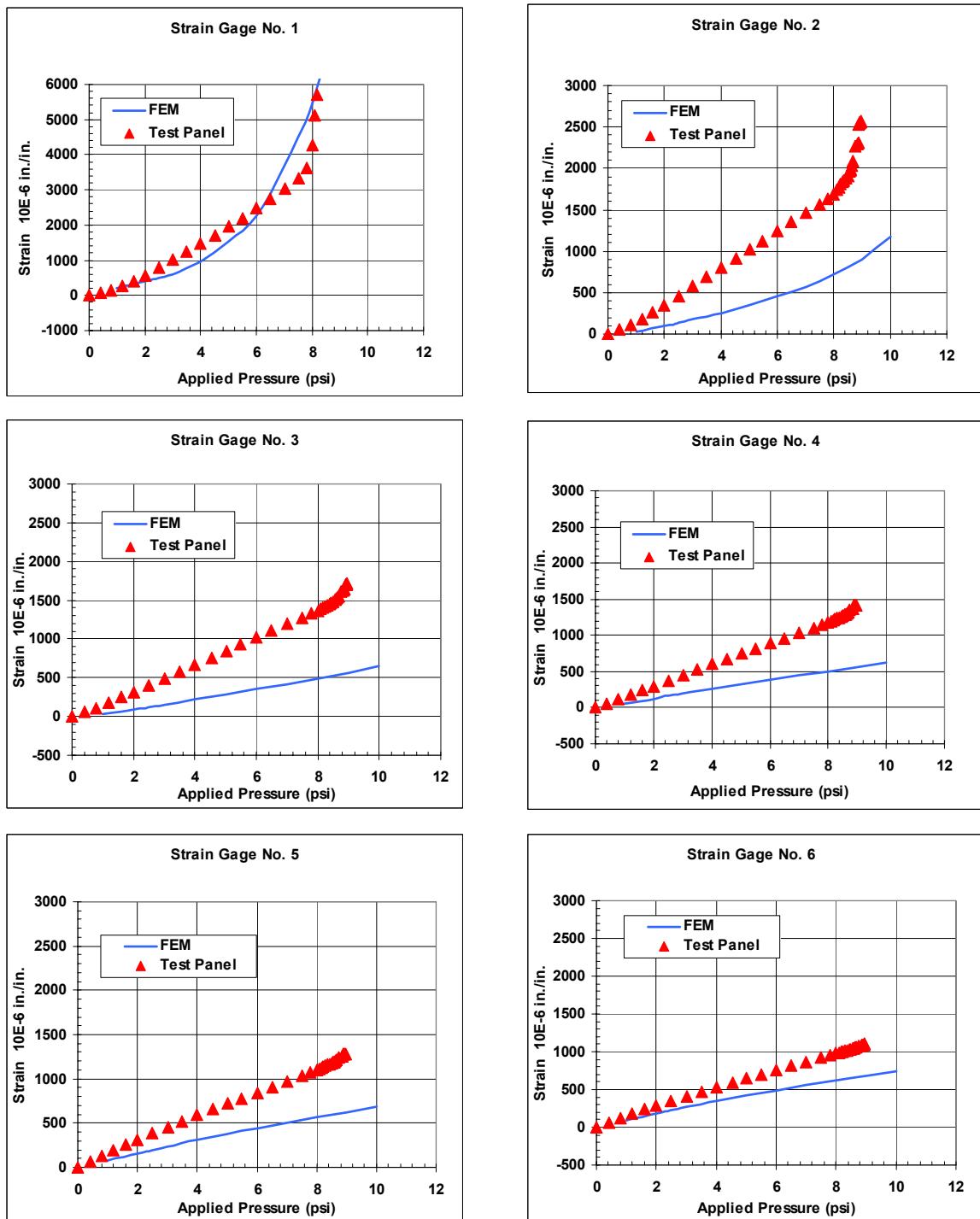


FIGURE I-11. TEST VS ANALYSIS RESULTS FOR STRAIN GAGE NOS. 1 THROUGH 6 (A/C LHS)

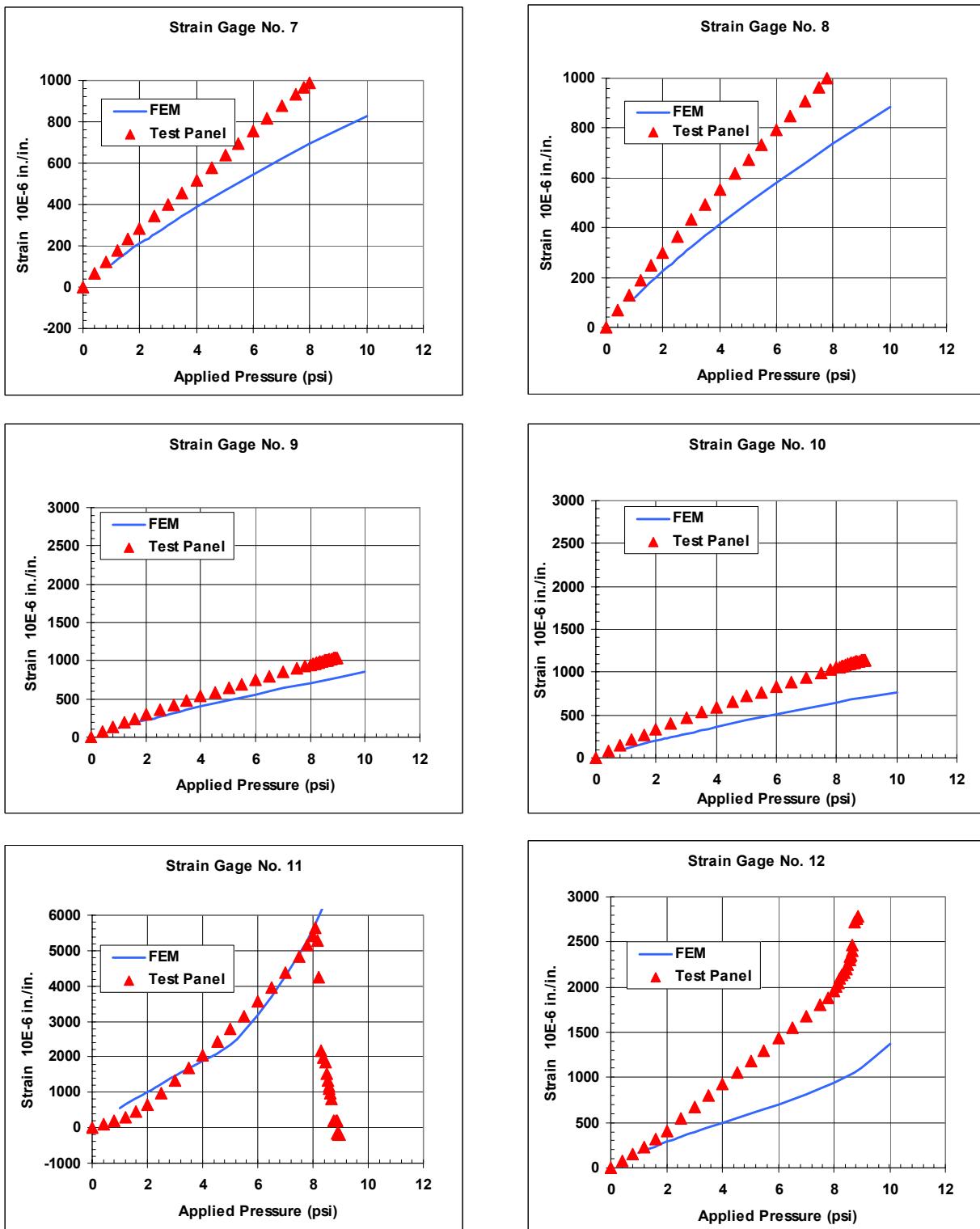


FIGURE I-12. TEST VS ANALYSIS RESULTS FOR STRAIN GAGE NOS. 7 THROUGH 12 (A/C LHS)

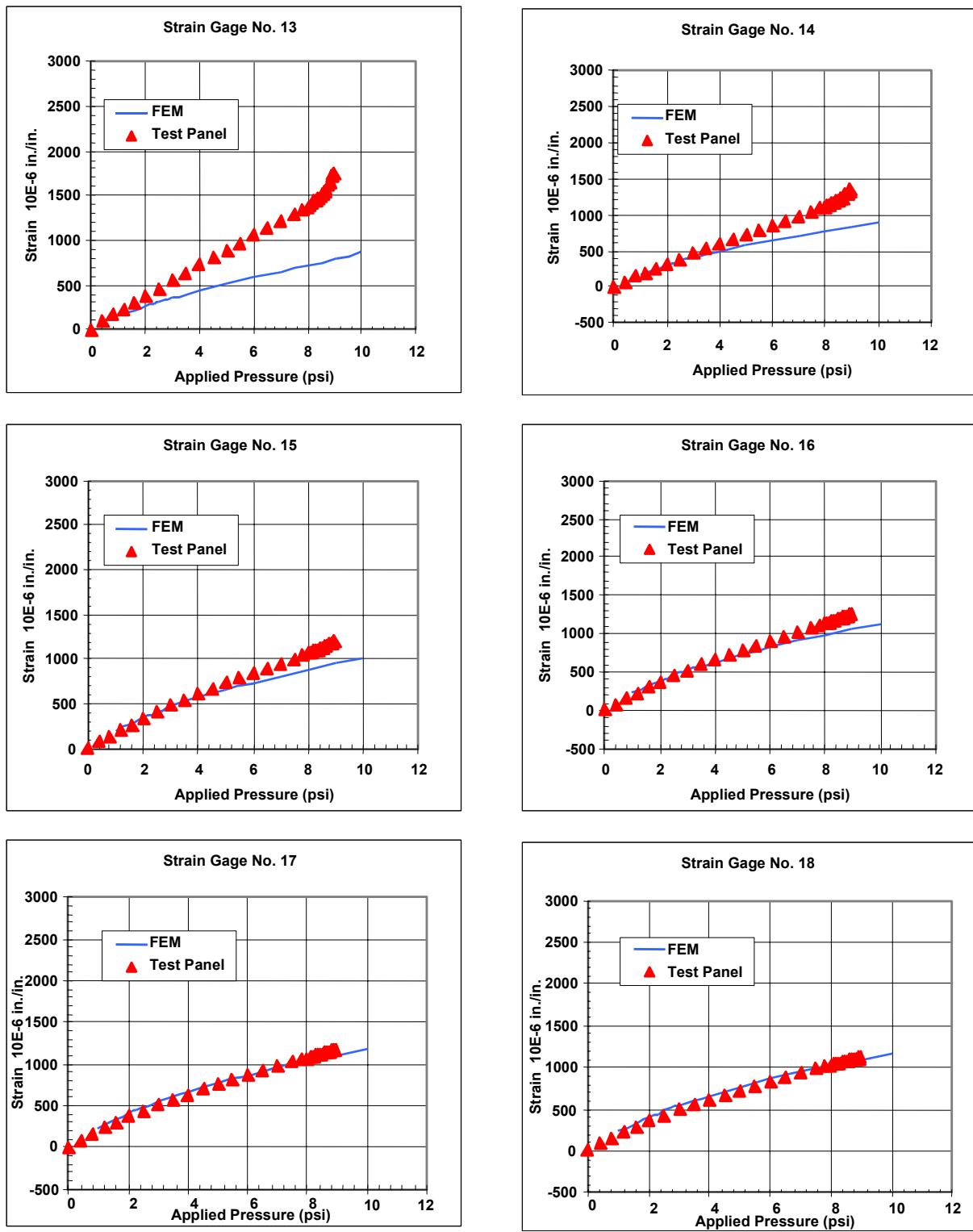


FIGURE I-13. TEST VS ANALYSIS RESULTS FOR STRAIN GAGE NOS. 13
THROUGH 18 (A/C LHS)

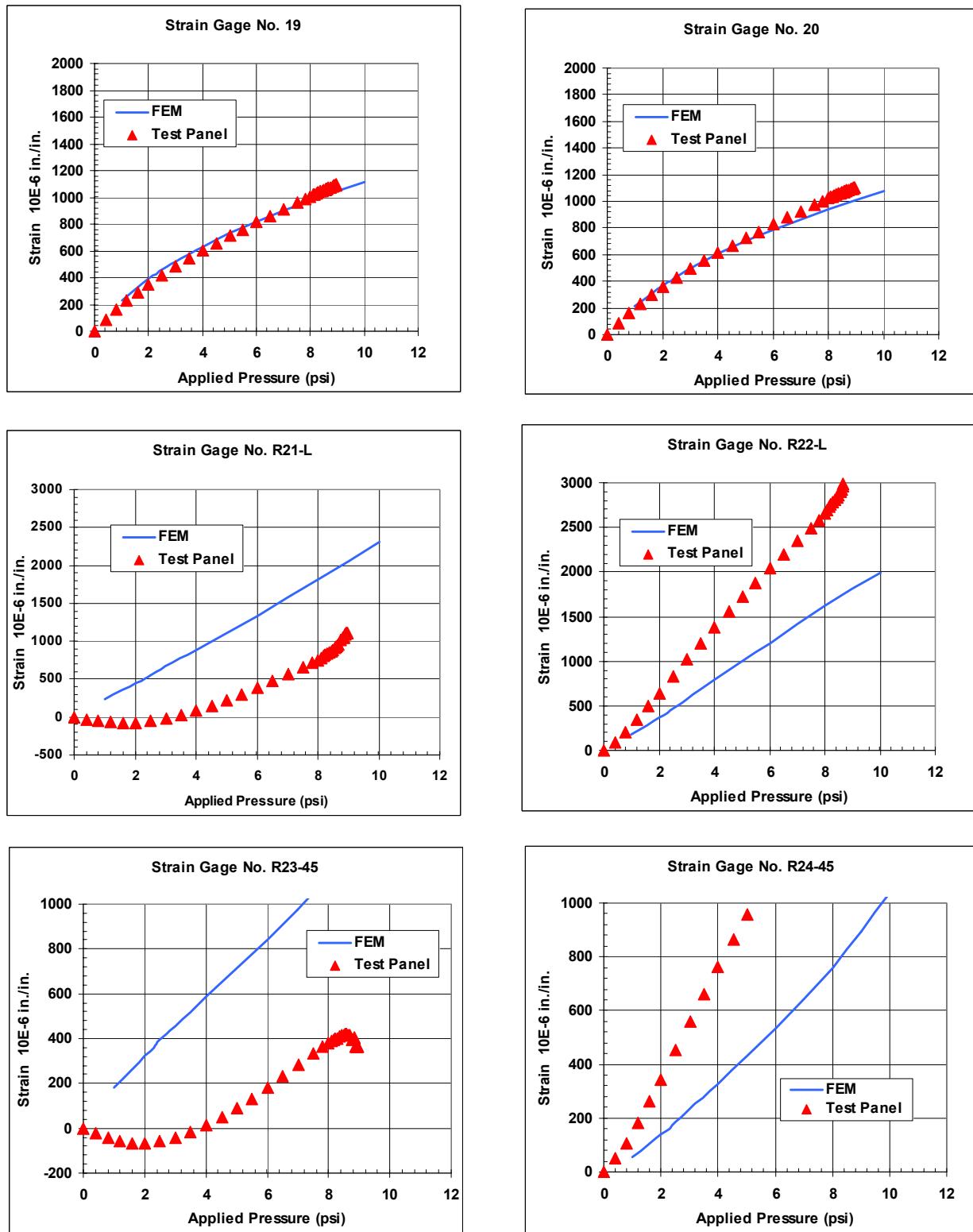


FIGURE I-14. TEST VS ANALYSIS RESULTS FOR STRAIN GAGE NOS. 19 THROUGH 24 (A/C LHS)

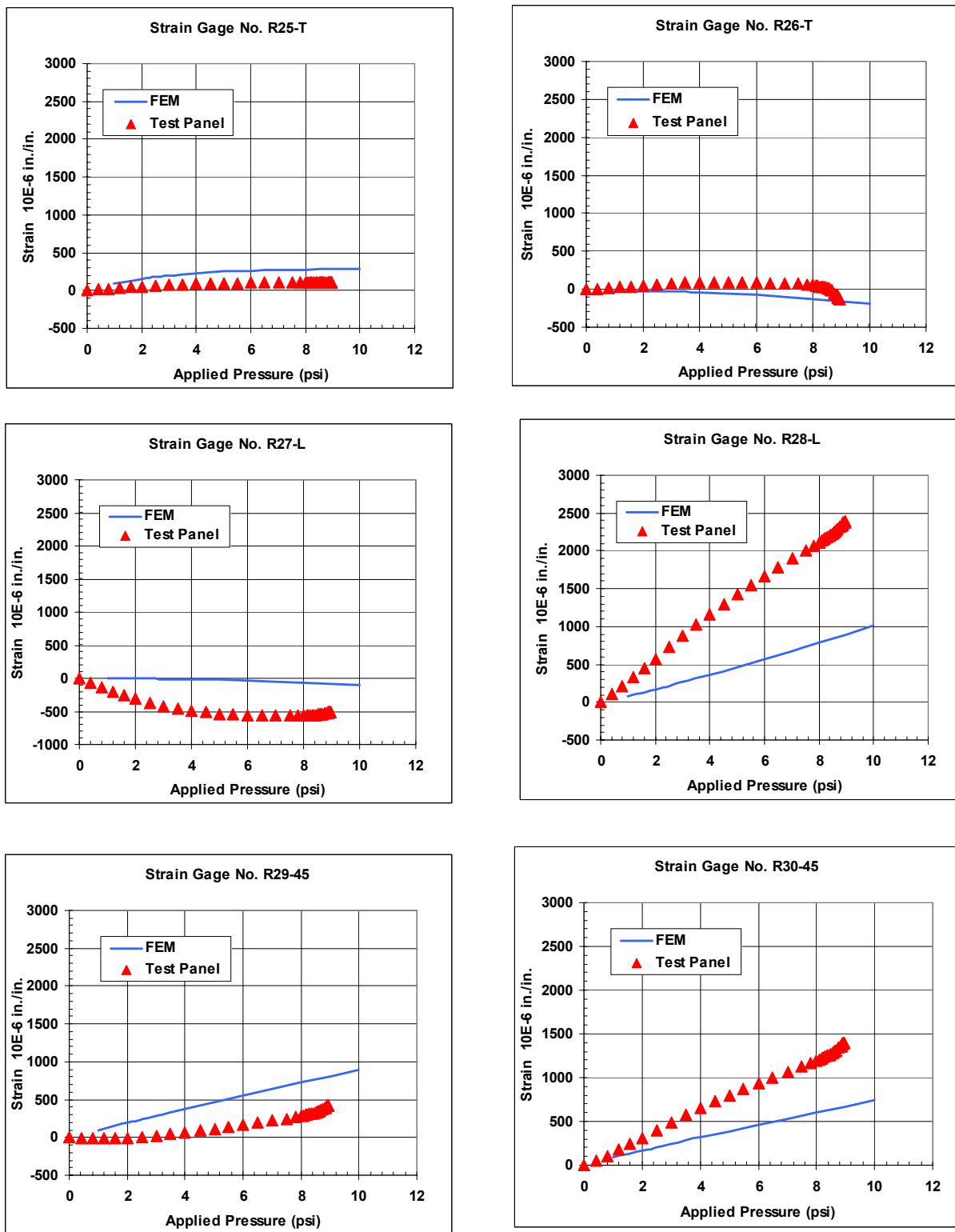


FIGURE I-15. TEST VS ANALYSIS RESULTS FOR STRAIN GAGE NOS. 25 THROUGH 30 (A/C LHS)

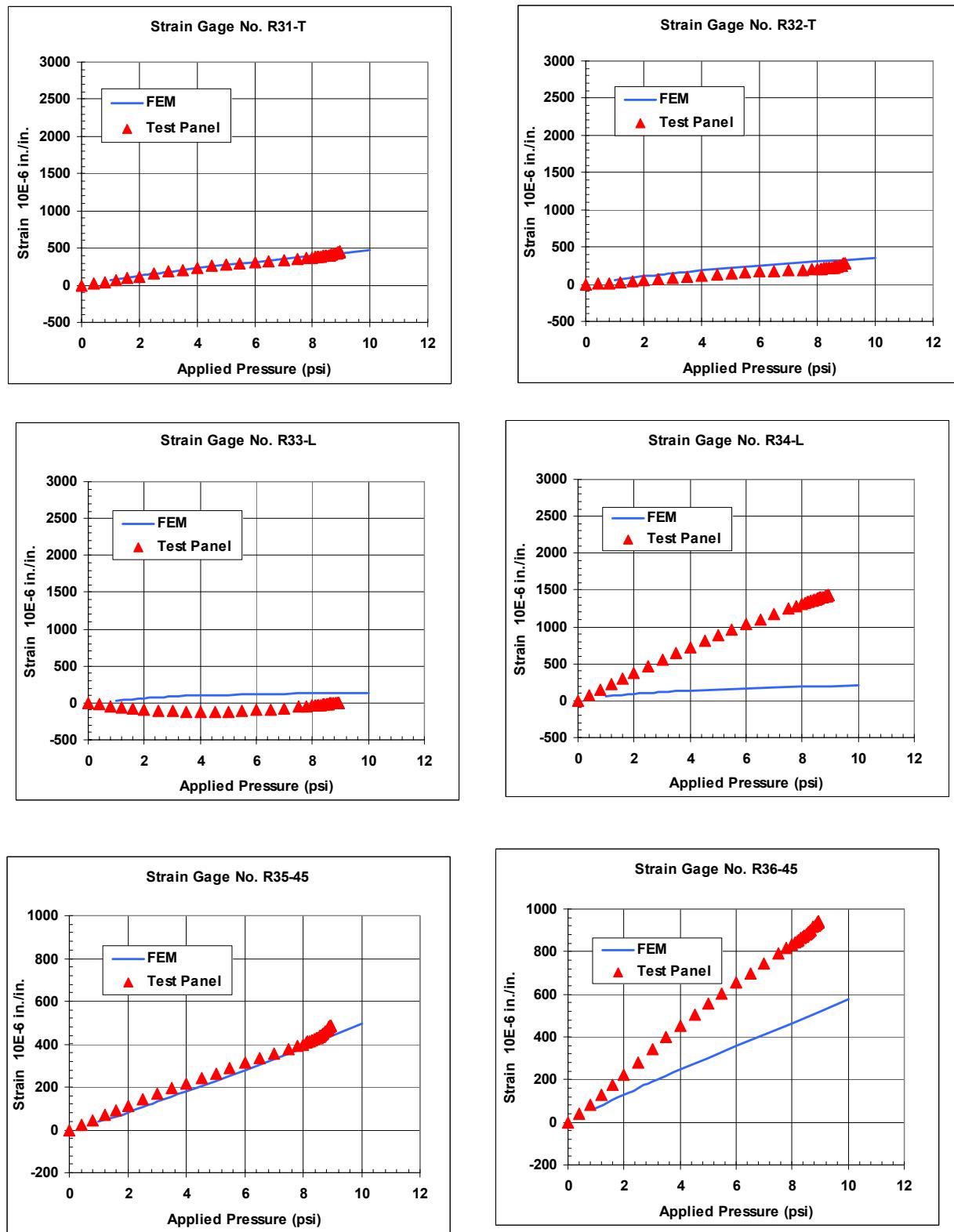


FIGURE I-16. TEST VS ANALYSIS RESULTS FOR STRAIN GAGE NOS. 31 THROUGH 36 (A/C LHS)

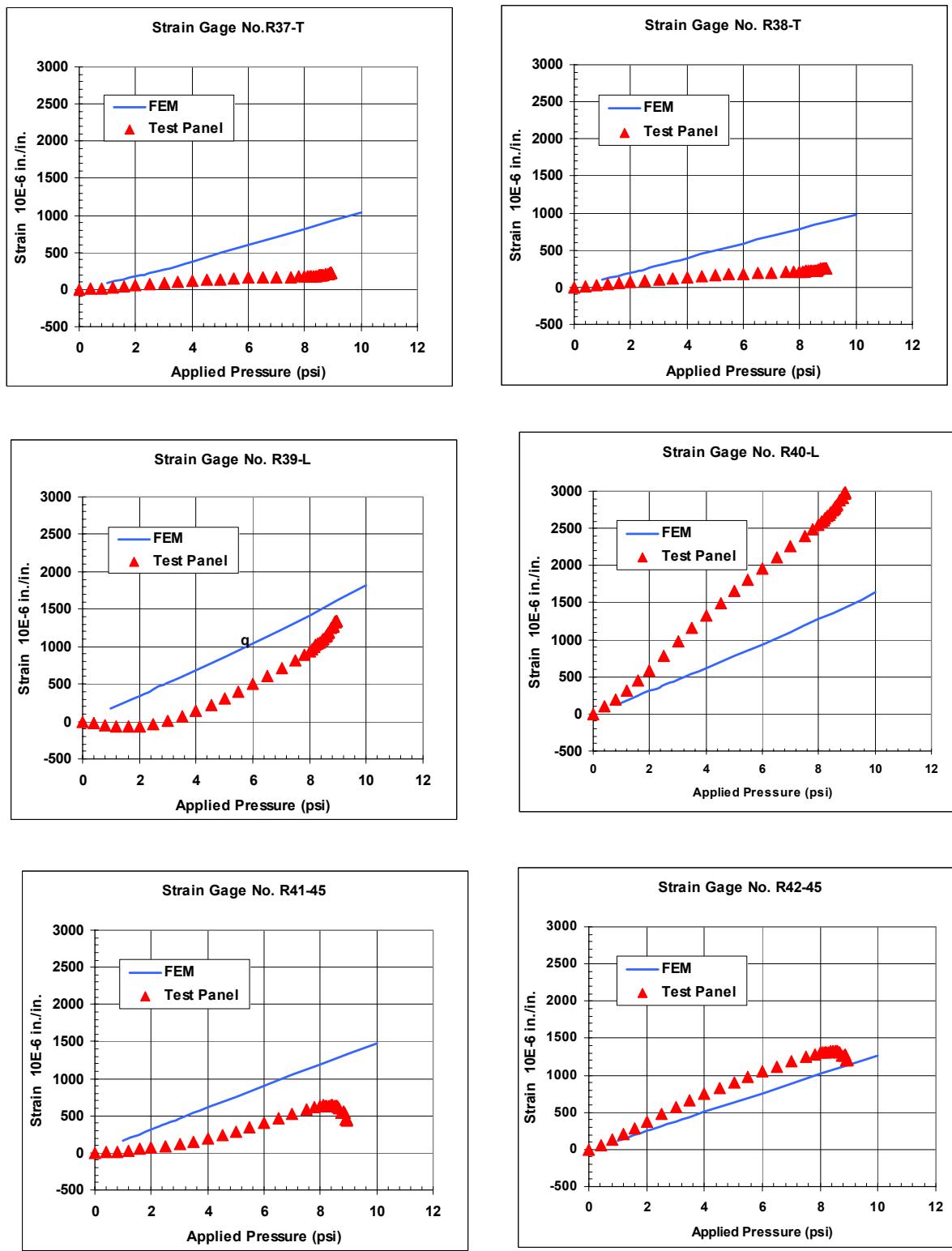


FIGURE I-17. TEST VS ANALYSIS RESULTS FOR STRAIN GAGE NOS. 37 THROUGH 42 (A/C LHS)

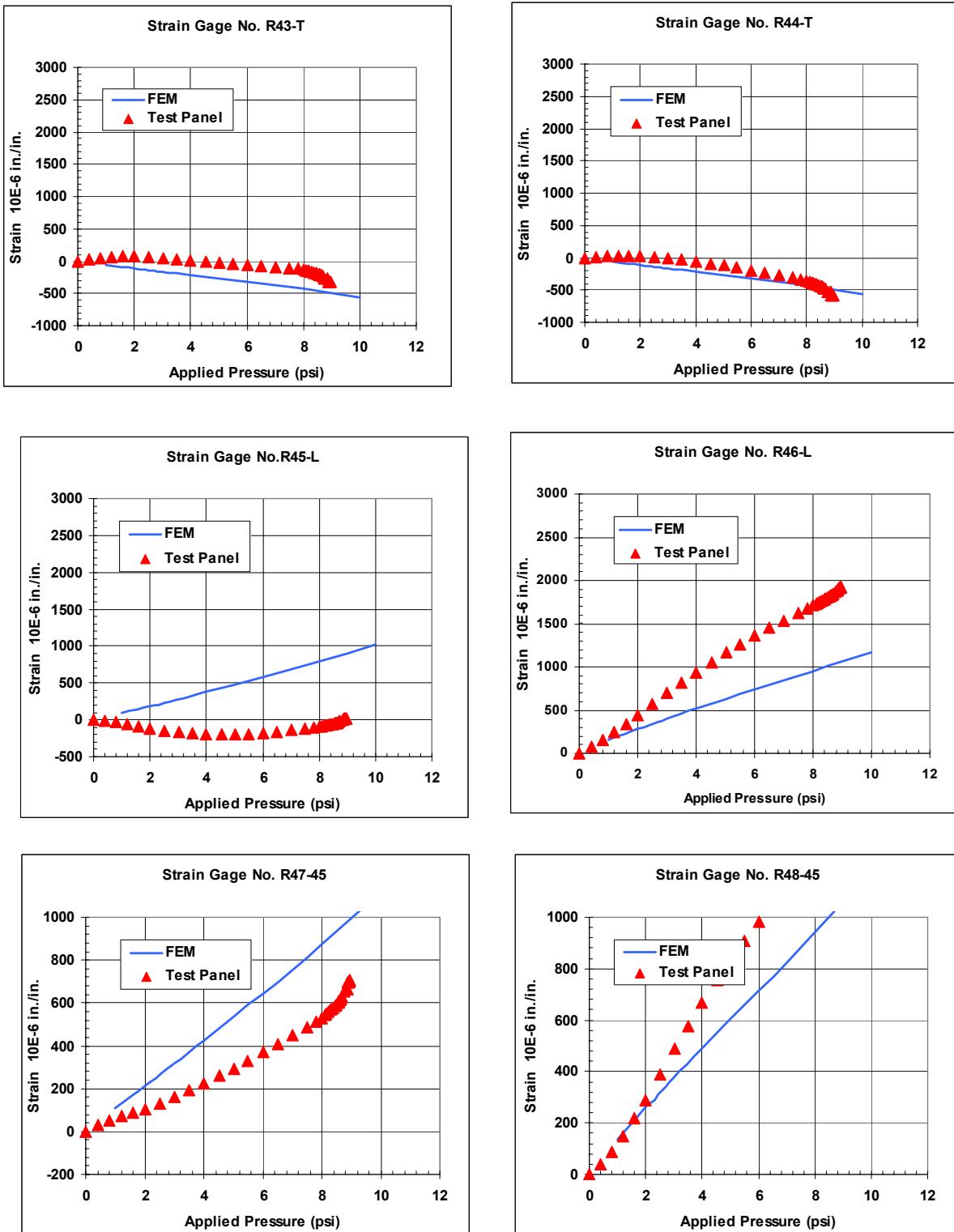


FIGURE I-18. TEST VS ANALYSIS RESULTS FOR STRAIN GAGE NOS. 43
THROUGH 48 (A/C LHS)

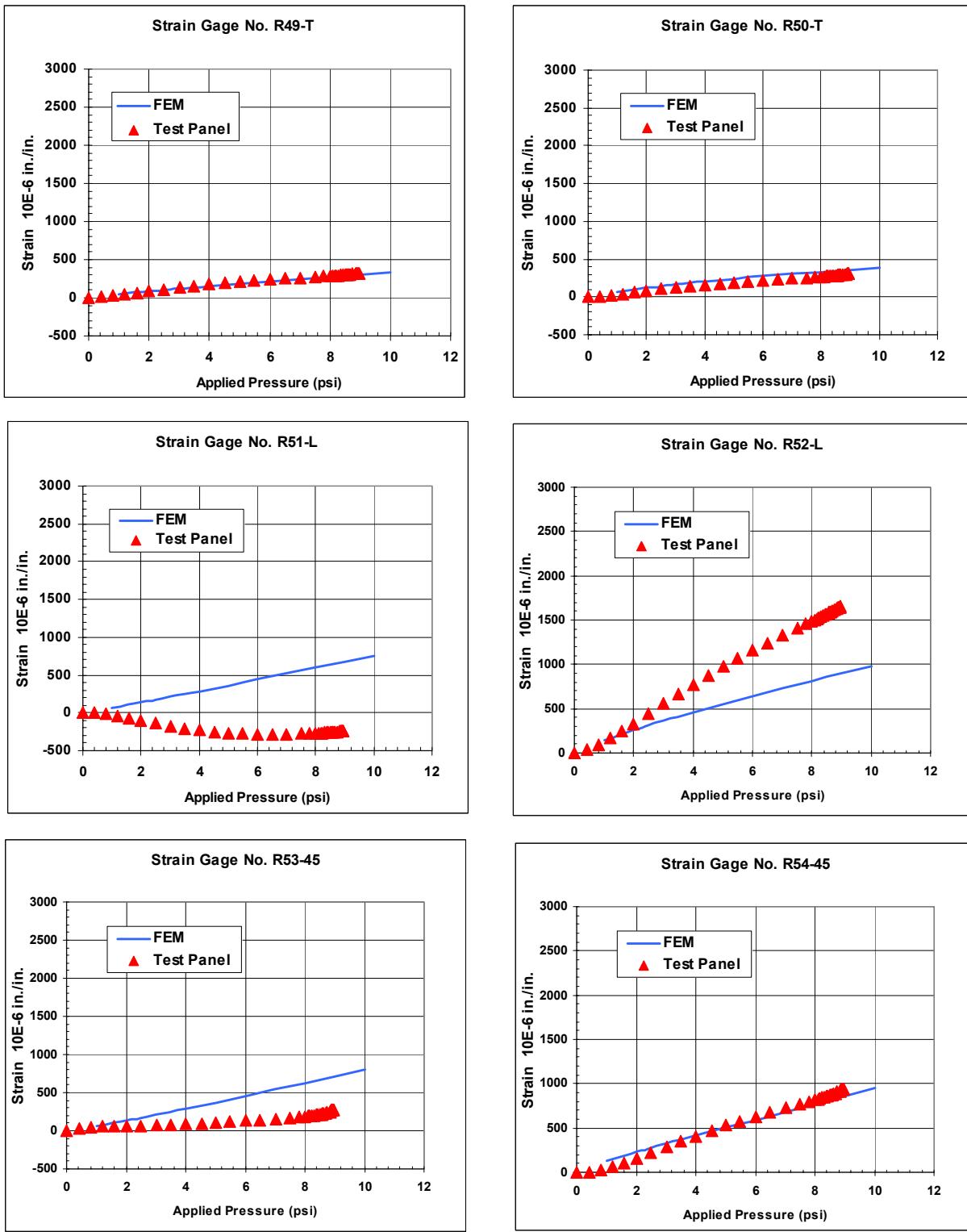


FIGURE I-19. TEST VS ANALYSIS RESULTS FOR STRAIN GAGE NOS. 49
THROUGH 54 (A/C LHS)

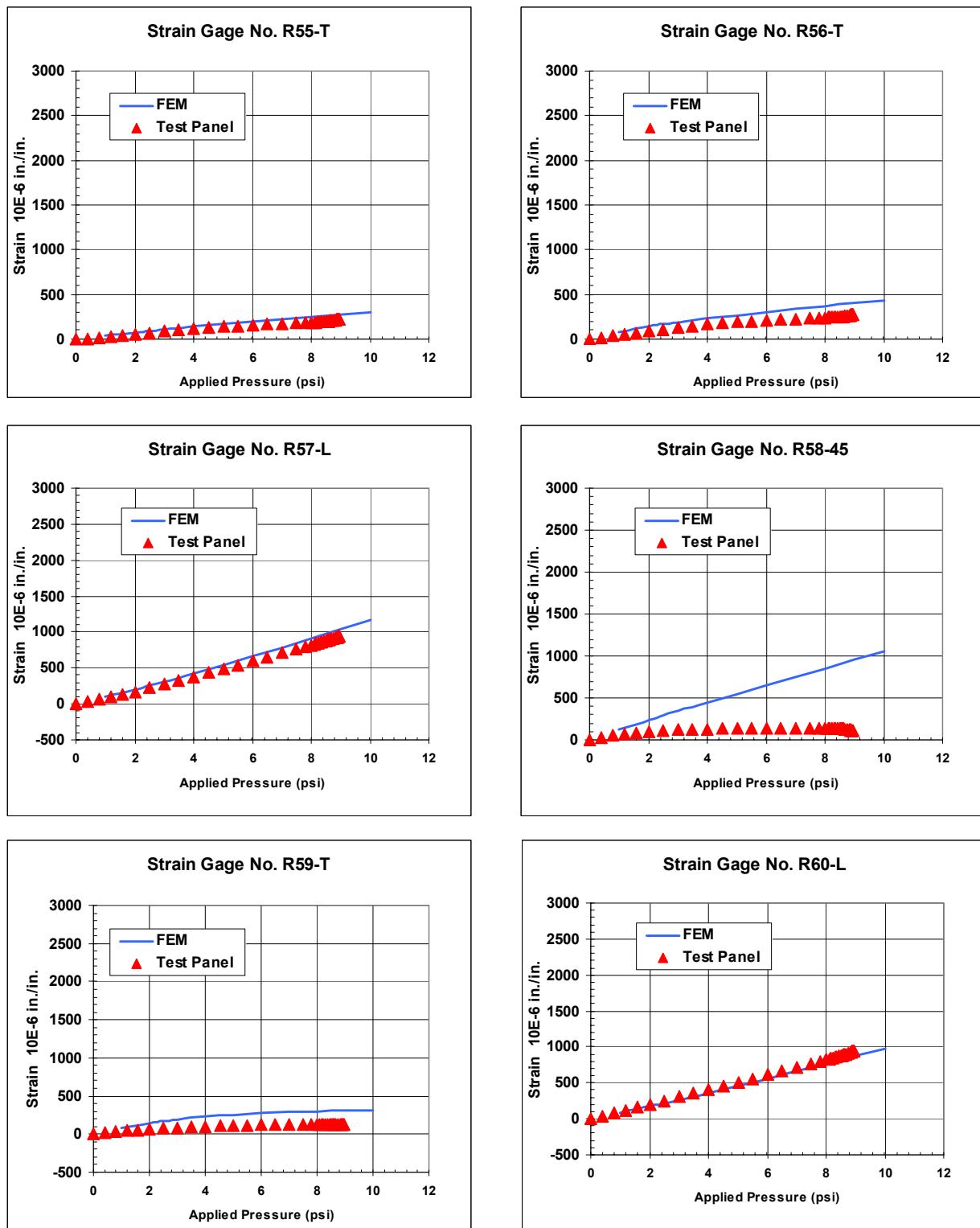


FIGURE I-20. TEST VS ANALYSIS RESULTS FOR STRAIN GAGE NOS. 55
THROUGH 60 (A/C LHS)

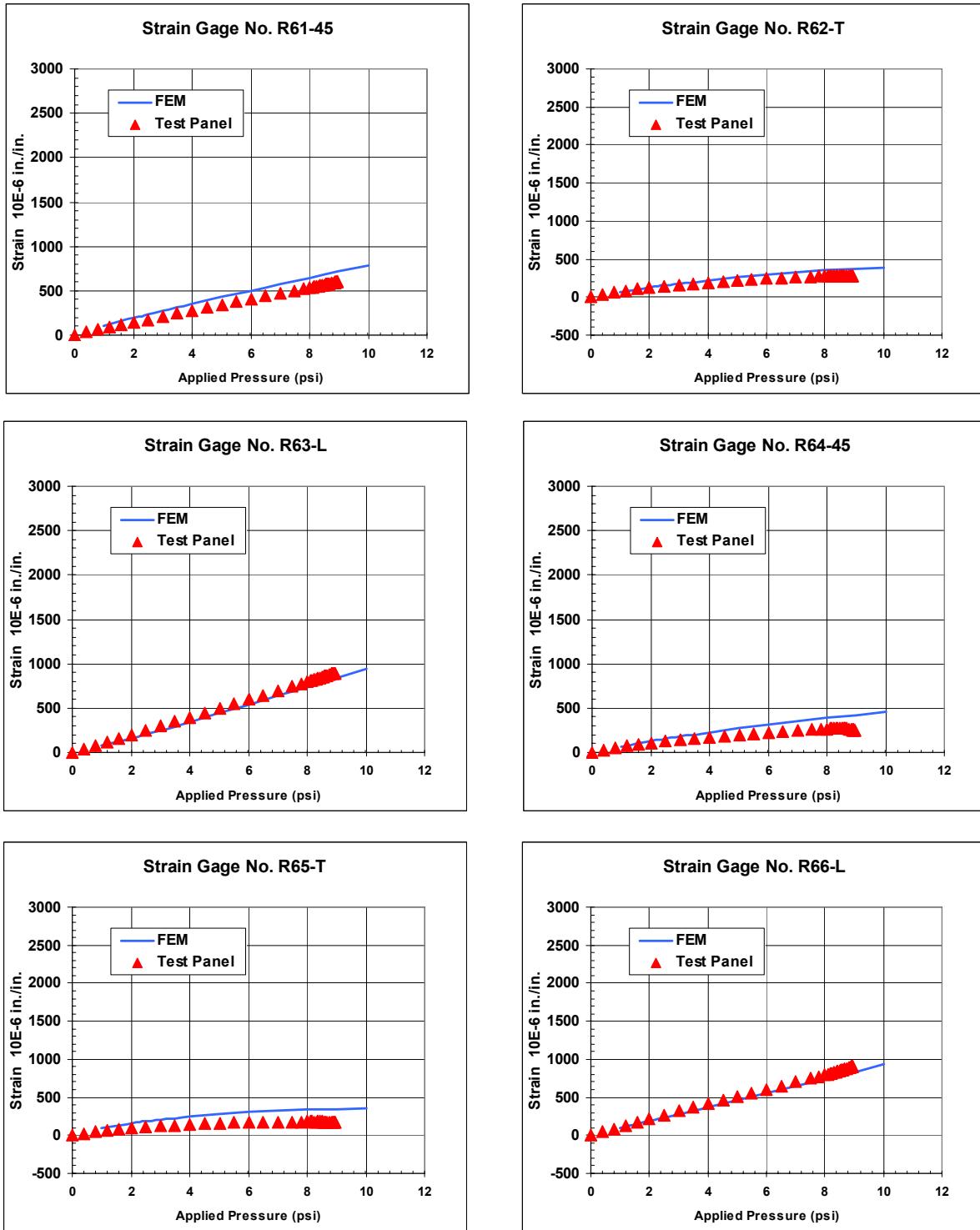


FIGURE I-21. TEST VS ANALYSIS RESULTS FOR STRAIN GAGE NOS. 61
THROUGH 66 (A/C LHS)

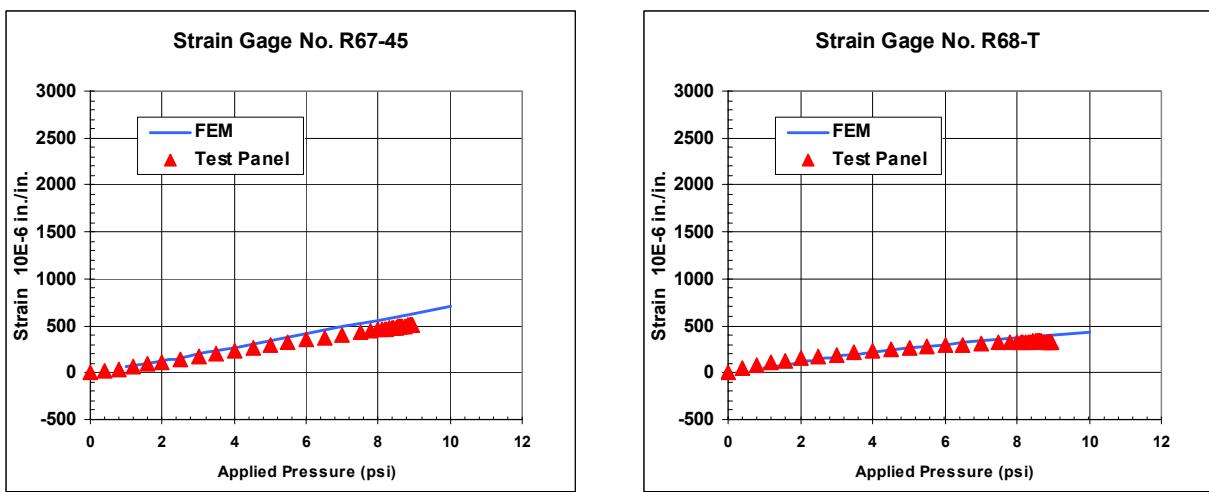


FIGURE I-22. TEST VS ANALYSIS RESULTS FOR STRAIN GAGE NOS.
67 AND 68 (A/C LHS)

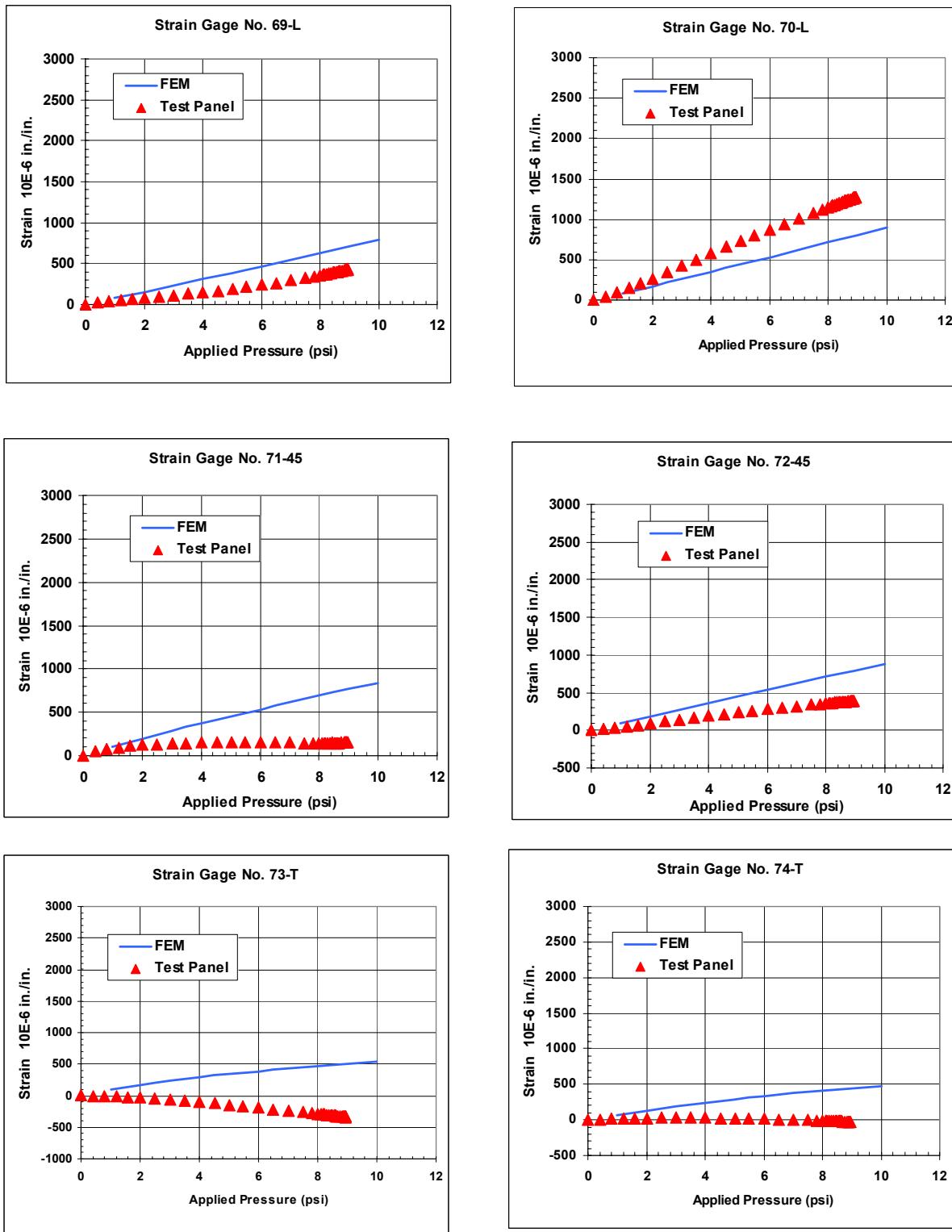


FIGURE I-23. TEST VS ANALYSIS RESULTS FOR STRAIN GAGE NOS. 69 THROUGH 74 (A/C RHS)

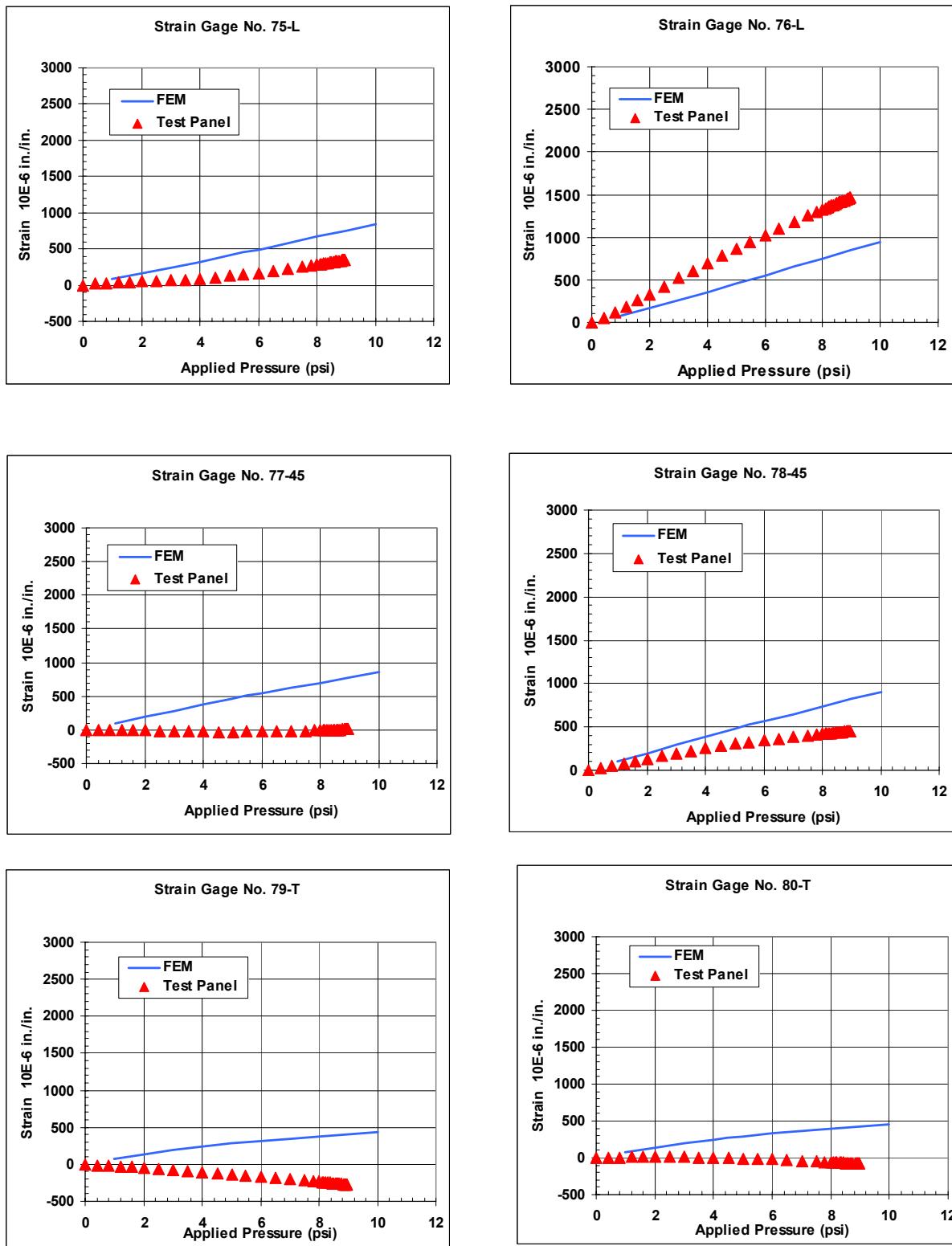


FIGURE I-24. TEST VS ANALYSIS RESULTS FOR STRAIN GAGE NOS. 75 THROUGH 80 (A/C RHS)

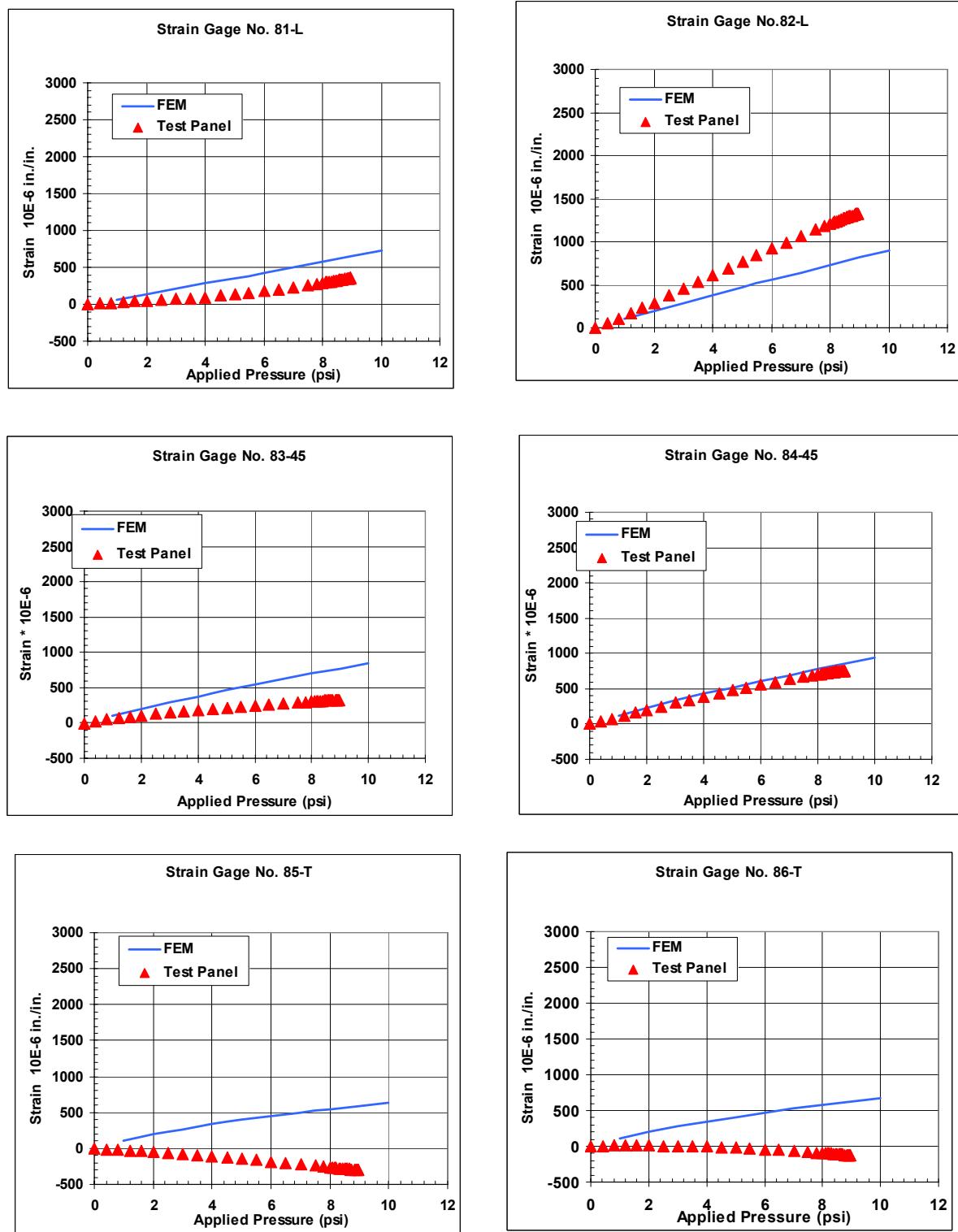


FIGURE I-25. TEST VS ANALYSIS RESULTS FOR STRAIN GAGE NOS. 81 THROUGH 86 (A/C RHS)

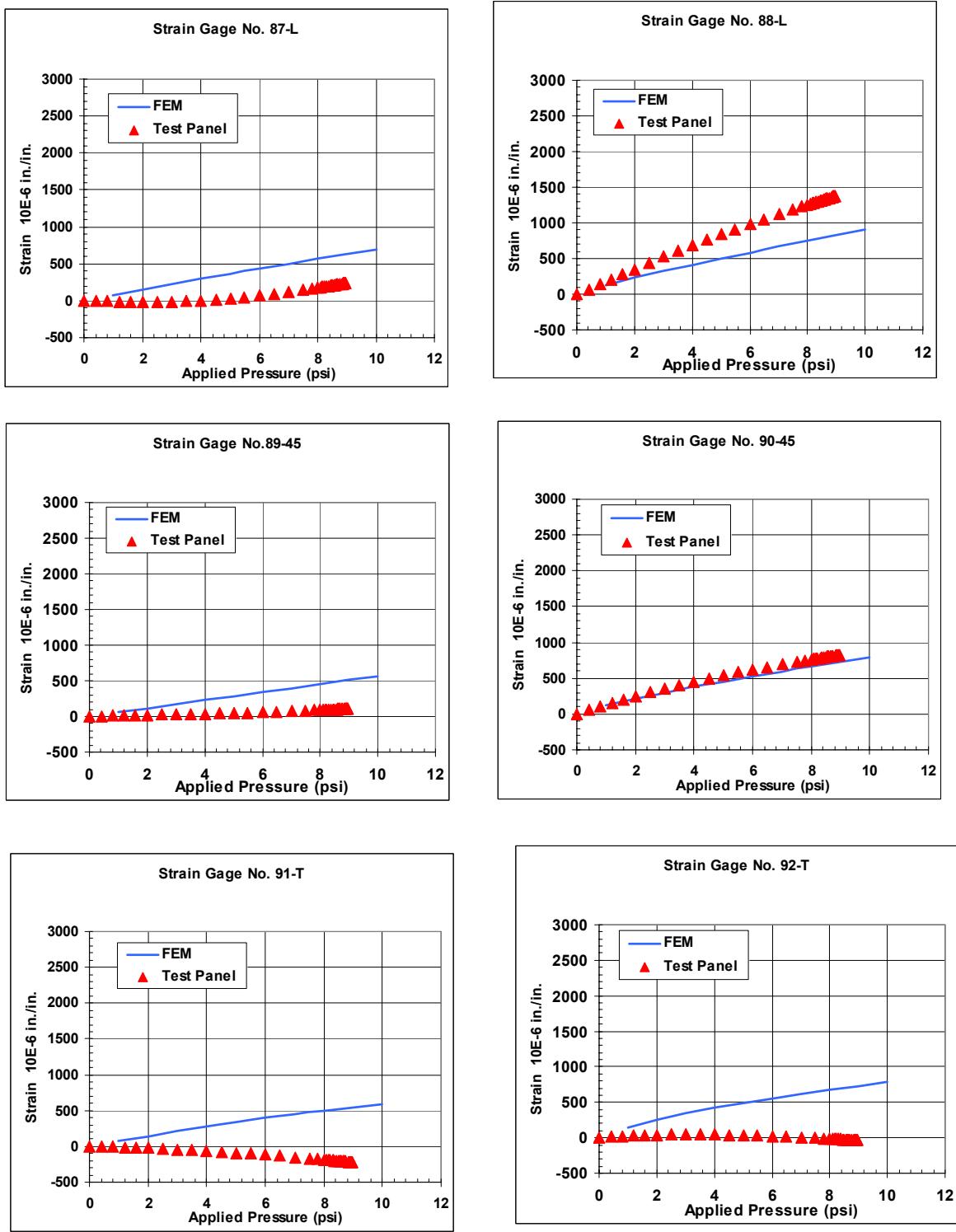


FIGURE I-26. TEST VS ANALYSIS RESULTS FOR STRAIN GAGE NOS. 87
THROUGH 92 (A/C RHS)

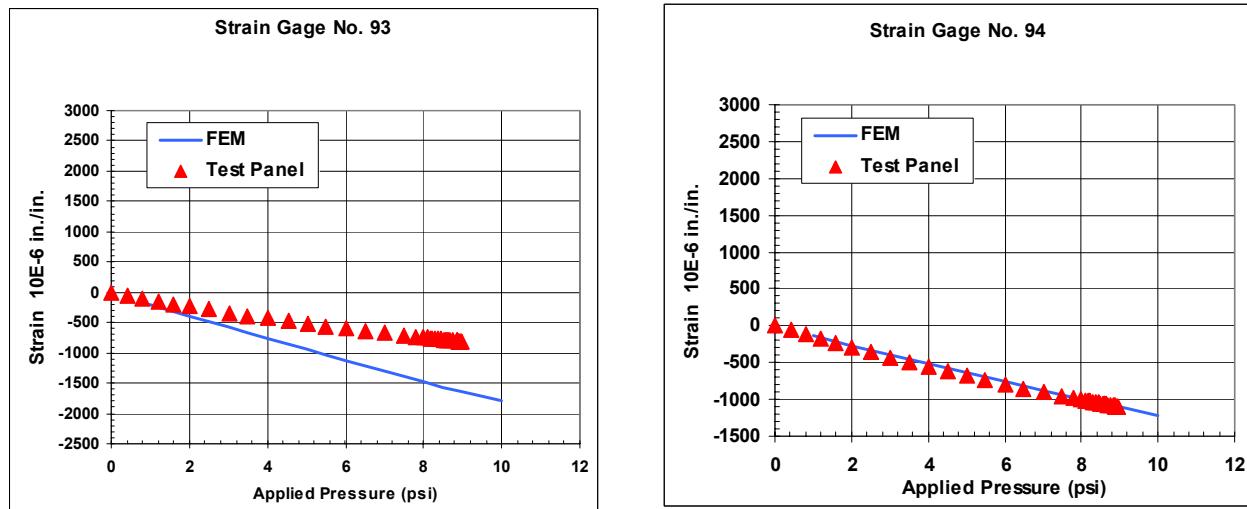


FIGURE I-27. TEST VS ANALYSIS RESULTS FOR STRAIN GAGE NOS.
93 AND 94 (A/C RHS)